NSERC CRSNG

NSERC Contact

Volume 20, No. 3
Winter 1995

Tom Brzustowski Appointed NSERC President

On September 14, Industry Minister John Manley announced the appointment of Dr. Thomas A. Brzustowski as President of NSERC. His 5-year term began on October 2.

Born in Poland in 1937, Tom Brzustowski came to Canada in 1948. He graduated from the University of Toronto with a Bachelor of Science degree in Engineering Physics, and later went on to graduate studies at Princeton, earning a Master's and a Ph.D. in Aeronautical Engineering.

Dr. Brzustowski taught and carried out research in thermodynamics and combustion as a professor of mechanical engineering at the University of Waterloo from 1962 to 1987. During that time he was also Chair of the Department of Mechanical Engineering, Associate Dean of Engineering for Graduate Studies, Vice-President, Academic, and Provost.

In these capacities he successfully combined university administration with teaching and research. While he was Vice-President, Academic, his research support from NSERC grew to one of the highest levels in the university, and he continued teaching undergraduates and supervising graduate students until his departure from Waterloo.

In October 1987, Dr. Brzustowski joined the Government of Ontario as Deputy Minister of Colleges and Universities, the senior civil servant in charge of post-secondary education. From 1991 to 1995, he served as Deputy Minister of the Premier's Council of Ontario and of its predecessor Premier's Councils on Economic Renewal (from 1991) and on Health Well-Being and Social Justice (from 1993).

NSERC Launches Web Site

NSERC's Web site was launched on September 1. Since then, many researchers have visited the site for information on our

programs, services, and policies. Information is being added and updated regularly, so we encourage you to visit the site often. A section on Ethics was recently added (under Programs), as were several new publications. You can help us to build and improve on this Web site by sending comments and suggestions on the site to our internet address: www@nserc.ca

In mid-December, an NCE (Networks of Centres of Excellence) Web site was launched www.nce.gc.ca. Although the NCE program is managed jointly by NSERC, SSHRC, CIHR, and Industry Canada, NSERC houses the secretariat and has taken on responsibility for the Web site. The site contains information on the networks' ongoing activities as well as program-related information. In the "Impact" section, various NCE-related success stories are highlighted.

The NSERC Gopher server was introduced in December 1994 and it proved to be a highly effective communications tool for disseminating urgent information to the community quickly. However, since it is an older technology that is rapidly losing ground, NSERC is investigating its continued use at the Council. In the meantime, we are maintaining the Gopher server for reference purposes only and using the Web as the predominant means of getting news out to the community.

Electronic Forms Gain Momentum

For the past two years researchers applying to NSERC have been able to fill out their forms electronically with the help of JetForm software. Forms 100 and 101 are now available in both a Windows version for PC users and a Macintosh version. Researchers can access these forms from NSERC's Web site (http://www.nserc.ca). The Council also offers technical support to those using the Jetform software and the electronic forms. The resource person, Francine Leclair, can be reached by telephone at (613) 995-4273, or by e-mail at fxc@nserc.ca.

In 1996-97, 23% of the Research Grant applications were submitted on electronic forms.

During the next two months NSERC, along with several universities, will be launching a pilot project aimed at testing several tools recently developed to facilitate the manipulation of documents by staff in university research grants offices. The pilot project will also enable NSERC to test the transmission over the Internet of data contained in the grant applications.

Industry, University Leaders Call for Closer Research Ties

University and industry leaders from across Canada say universities should give greater recognition to faculty members who collaborate with industry on research and development projects.

The recommendation came at a symposium on university-industry research and development partnerships held in Toronto in late September. About 175 university, industry and government decision-makers attended the meeting, sponsored by NSERC and The Conference Board of Canada.

Conference participants also called on governments to reform the tax structure to encourage small and medium-sized businesses to do more research and development in collaboration with universities.

NSERC and the Conference Board sponsored the two-day meeting to foster closer ties between university researchers and industry. Conference Co-chair Peter Morand (then President of NSERC) told reporters following the symposium that universities and industry have separate and distinct mandates.

"We're talking about partnerships here, not changing the mandates of either universities or industry," said Dr. Morand. "The two sectors have very distinct roles, and that shouldn't change. But what needs to change is the level of cooperation between the two. If Canada intends to maintain its position as an industrial power, we need to make better use of this country's university research and development capabilities. And that means identifying common goals, and working together."

Conference participants were told that universities have a key role to play in fostering an entrepreneurial culture in Canada. Various speakers noted that scarce research funds and fierce international competition were making university-industry research collaboration increasingly important.

A survey undertaken by NSERC and the Conference Board earlier this year pointed to significant cultural differences between the two sectors. But the survey also showed a genuine willingness on the part of university and industry leaders to work together on R&D.

Participants in the conference said industry is often unaware of the research capabilities within Canadian universities. They called on NSERC and individual institutions to do a better job of communicating their research strengths. They said involving students, especially at the graduate level, in collaborative research projects with industry should be a priority.

Dr. Morand said the two-day symposium confirmed the need for increased dialogue between university and industry leaders.

"The participants in this conference showed a tremendous level

of interest in fostering closer ties in the areas of research and development," he said. "It's clear that we need more examples of successful partnerships, models of effective joint ventures, and a better understanding of the needs and capabilities of our universities and Canadian industry."

Dr. Morand and Conference Board President and CEO Dr. Jim Nininger said the two organizations plan to go on working together to promote these linkages.

"Universities offer a significant means of leveraging the research capabilities of Canadian business, especially small and medium-sized firms," said Dr. Nininger. "This is an issue that's been before the Conference Board for some time now, and based on what we heard at the symposium, it's an issue that will continue to demand our attention for some time to come. The important thing is, we've made significant progress in breaking down some of the barriers to university-industry collaboration. Now, we need to keep up the momentum."

The conference report, including a list of participant recommendations, will be available on NSERC's Web site early in 1996.

Canadian Industries, Universities Receive Awards for Research Partnerships

Five Canadian corporations, five universities, an industry research institute and a university- industry consortium recently received awards for outstanding performance in university-industry collaboration in research and development.

The awards were presented by NSERC and The Conference Board of Canada at a symposium on university-industry R&D collaboration held in Toronto on September 20 and 21. NSERC and the Conference Board created the awards and sponsored the symposium in an effort to foster closer ties between university and industry researchers.

More than 50 university and industry partners from across Canada competed in the program. Entries were judged for their innovation, creativity and entrepreneurship as well as for their effective use of university and industry human and technical resources. In addition, entrants had to demonstrate commercial benefits to Canadian industry and tangible rewards for the university partner.

The winners of the inaugural awards, which included a $10,000 NSERC research grant to each of the university partners, were:

ATS Aerospace, St. Bruno, Que., and **McGill University**,

Montreal, for developing the world's first 3-D air traffic control tower simulator. Their visual tower simulator combines simulation and modeling software with 3-D graphics to produce a 360 degree view of an airport as seen from a control tower. The system allows trainees to recreate a virtual reality environment that simulates weather conditions and emergency situations they could encounter later in their career. McGill computer science professor Gerald Ratzer and ATS president William Friend first teamed up some 30 years ago to develop the first air traffic control radar simulator.

Pipetronix Limited, Concord, Ont., and **Queen's University**, Kingston, for developing new technology in oil and gas pipeline inspection systems. For the last 17 years, Dr. David Atherton and his colleagues in the university's applied magnetics research group have been developing theories and models that allow magnetic signals to be converted into accurate estimates of pipeline defects. Their work has led to worldwide recognition and to new advances in pipeline inspection techniques, commercialized by Pipetronix. With some 16,000 kilometres of pipelines in Canada and close to half a million kilometres in the United States, maintaining the safe engineering life of the lines could save hundreds of millions of dollars.

Bayer Rubber Inc., Sarnia, Ont., and the **University of Waterloo**, for developing new high-performance materials for the auto industry. In the early 1980s, Polysar Limited, of Sarnia -- a company that has since become Bayer Rubber Inc. -- set out to develop rubber products that had a higher resistance to heat and oil. The new products were needed because higher automobile engine temperatures were resulting in shorter life-spans for belts, gaskets, hoses and other polymer-based engine parts. Collaborations with Dr. Garry Rempel and the university's Institute for Polymer Research led to a process technology that was patented worldwide two years later. Other products and technologies have since been developed, and Bayer Rubber has continued the partnership to find new, less expensive materials for hydrogenation.

TRLabs, Edmonton, a consortium of universities and industries throughout Western Canada, for R&D in telecommunications. Canada's largest non-governmental, not-for-profit telecommunications research organization, TRLabs has a research and development partnership that has led to more than 20 patents and the creation of two new companies. Partners in the consortium share the labs' outputs, which have included more than 60 major technology innovations, about two-thirds of which have been transferred to industry. Levering scarce research funds is an important benefit for the partners, as is human resource development. Providing advanced educational opportunities for their students and levering their professors' research activities are key priorities of the universities involved. By working alongside industry researchers at TRLabs, university students are able to apply their learning to an industrially relevant environment.

Petroleum Recovery Institute, Calgary, and the **University of Calgary**, for developing new processes in oil and gas recovery. The Petroleum Recovery Institute is supported by 30 companies in the oil and gas industry from 11 countries. In 1991, PRI researcher Laurier Schramm worked out a deal with U of C officials to allow him to teach a course in industrial chemistry at the university. The idea was to provide opportunities for U of C graduate students to work in the institute's labs under the supervision of a U of C faculty member. Dr. Schramm and his students have developed instruments and models that allow the oil industry to test the effectiveness of enhanced oil recovery processes under high-temperature and high-pressure conditions typically found in underground oil and gas reservoirs.

Litton Systems, Toronto, **Noranda Advanced Materials**, Saint-Laurent, Que., and the **University of Toronto**, for research into the development of 3-D digital x-ray imaging systems. Unlike other, digitally based imaging techniques, conventional x-rays cannot be stored or viewed on a computer or electronically transferred from one location to another. These and other limitations are making conventional x-rays increasingly more costly. For the last several years, John Rowlands, a member of the medical imaging research group that works out of U of T's Sunnybrook Health Science Centre, has carried out research focused on the development of a digital x-ray imaging system. About nine years ago, he began working with Noranda to develop a selenium layer capable of providing a high-quality x-ray readout. A few years ago, Litton Systems entered the partnership. Progress has been steady, and the group has successfully demonstrated images on small panels. According to Dr. Rowlands, "A practical, flat panel digital x-ray system with high image quality and reasonable cost would revolutionize radiology." He estimates that the international health care market could yield up to $600 million in annual sales. The technology has other possible applications as well, for instance, in grading lumber and inspecting airport baggage.

By showcasing examples of highly successful R&D partnerships, NSERC and the Conference Board want to alert the Canadian business community that there are plenty of opportunities to collaborate with universities. The two organizations plan to continue the awards program next year.

NSERC Consolidates Its Partnership Activities

NSERC has consolidated its activities requiring significant involvement by partners outside the academic sector capable of using the research results for the benefit of Canada. At its October meeting, Council approved the regrouping of programs as a means of better representing the extent of partnership and

collaboration already present in NSERC activities and promoting stronger links between researchers and research users.

The consolidation of all of NSERC's core project-oriented programs (with the exception of the Collaborative Project Grants program), within a single "Research Partnerships Program" (RPP), will result in a more flexible delivery mechanism. This single program replaces the present Research Partnerships and Strategic Grants programs, and parts of the Collaborative Special Project grants program, and encompasses the NCEs and Technology Partnerships Program, two independently funded tri-council programs NSERC administers.The Research Partnerships Program is designed to accommodate proposals that span the whole range of research from the development of fundamental knowledge to highly industrially relevant research and that involve one or many partners.

The objective of the Research Partnerships Program, and of all the grant types contained within this grouping, is to foster interactions and partnerships between university researchers and other sectors in order to generate new knowledge and develop new expertise, and to transfer this knowledge and expertise to Canadian-based organizations. Participating students and other personnel will have the opportunity to interact with the partner organizations through reciprocal laboratory visits, joint workshops, and seminars.

RPP objective is achieved through three grant types: Strategic Projects, Research Networks, and University-Industry Projects.

Strategic Projects will fund small to medium-sized group projects through an annual competition. It differs from the current Strategic Grants program in that it will be open to projects in any field, so long as the project involves partners from outside the university sector, and will result in an economic, social, or environmental benefit for Canada. However, Council has the option to promote research in certain areas within Strategic Projects by setting a higher success rate in these areas. For the April 1996 competition, the following six areas will be promoted:

- information technologies,
- biotechnologies,
- environmental technologies,
- materials technologies,
- manufacturing and processing technologies, and
- energy efficiency technologies.

Area descriptions will give applicants a focus for research in these areas, and the competition budget will be allocated so that applications in the targeted areas have a higher chance of funding than those in the non-targeted areas. The non-university partner(s) must actively participate and/or make a financial contribution; the degree of partner participation will be

a selection criterion. Requests for equipment must be incorporated into the research proposal. Separate equipment requests will not be accepted.

Research Networks are complex research proposals involving multi-sectorial collaborations on a common research theme and requiring a management structure to direct, manage, and integrate the activities of the network. Applications may be submitted at any time, however there are two selection rounds per year that will take place on an "as needed" basis. As the first step of the application process, a Letter of Intent must be submitted. NSERC will assess the Letter of Intent and, if it determines that a formal application should be submitted, will invite the applicant to apply. Those interested in applying should contact RPP staff for more information.

University-Industry Projects are essentially the current suite of University-Industry programs known formerly as the Research Partnerships Program (RPP) of the Targeted Research Directorate, i.e., Collaborative Research and Development Grants, Industrially Oriented Research Grants, Industrial Research Chairs, New Faculty Support, and Chairs in the Management of Technological Change. In these projects, at least one partner must come from industry.

In addition to the three grant types, the program is complemented by two independently funded tri-council programs administered by NSERC: the Networks of Centres of Excellence Program, and the Technology Partnerships Program. NSERC also administers various Research Partnership Agreements with Canadian government departments and agencies.

The new structure will provide greater flexibility in budgeting and allocations among the activities within the Research Partnerships envelope, and will assist Council in responding rapidly to changes in the university research environment.

For futher information:

- see Programs, and/or
- university research grants' offices.

Results of the 1995 CPG Competition

Following the 1995 competition for the Collaborative Project Grants (CPG) program, 66 interdisciplinary collaborative projects were funded, for an overall success rate of 18.3%. The successful projects involve 265 investigators, 25% of whom are from sectors other than Canadian universities. Although the competition budget for 1995 was $6 million compared to $9 million in 1994, the reduced number of applications submitted in 1995 more than offset the budget reduction, resulting in a

66% higher success rate in 1995. On average, 4 investigators (applicant plus co-applicants) are participating in each awarded project. This ranges from a low of 3.5 in Panel A (expertise centred in the life sciences) to a high of 5.2 in Panel C (expertise centred in engineering and computing sciences). The numbers of investigators per awarded project decreased slightly from 1994, where the average was 4.5, and ranged from a low of 4.0 for panel C, to a high of 5.1 for panel B (expertise centred in the physical, earth, mathematical and statistical sciences. The results are summarized by panel in Table 1.

Table 1: Results of the 1994 and 1995 CPG Competitions

Panel	No. of Requests		No. of Awards		Success Rate %		Total Investigators $K		Average Grant $K	
	1994	1995	1994	1995	1994	1995	1994	1995	1994	1995
A	247	106	25	17	10.1	16.0	911	372	100.8	104.4
B	273	78	31	18	11.4	23.1	1 183	323	81.0	72.9
C	294	76	32	12	10.9	15.8	1 166	331	86.4	99.2
D	160	101	19	19	11.9	18.8	692	386	83.0	91.6
Total	974	361	107	66	11.0	18.3	3 952	1 412	87.6	91.2

Successful projects involve university participants from all provinces except Prince Edward Island. Saskatchewan has the highest university Participation Rate (the percentage of all investigators participating in an awarded project) at 23.8%, closely followed by Newfoundland (23.5%). The 1995 CPG Success Rate was only weakly correlated to university size (16% for small, 17.1% for medium, and 20% for large Canadian universities).

At its meeting in October, Council decided to cancel further CPG competitions. However, it reaffirmed its commitment to the support of collaboration, where appropriate, and instructed that support of collaboration leading to higher research accomplishment be encouraged as appropriate in all NSERC programs. For further information on Council's decision, please see "CPG Program Cancelled" .

Council Cancels CPG Program

At its meeting in October, Council approved the phase-out of the **Collaborative Project Grants** (CPG) program, as recommended by the Strategy Implementation Task Force. Although there will be no more competitions, commitments made in the 1994 and 1995 competitions will be respected. Given the financial environment projected for the coming years, it was clear that resources would not be sufficient to allow the CPG program to achieve its objectives, and that Council's efforts would be better spent in encouraging collaboration across all programs.

Reiterating its commitment to collaborative research, Council

mandated staff to work closely with the research community to ensure that practices both in the peer review process and in the universities promote the emergence of excellent collaborative proposals. As a first step, the distinction between NSERC individual and team Research Grants will be removed. Staff was also encouraged to develop closer ties with universities to try to break down barriers to collaboration arising from the university promotion and tenure process.

Council took another significant step towards implementing the recommendations of the Strategy Implementation Task Force by approving the regrouping of activities in the Targeted Programs area. The new Research Partnerships Program, described on p. 6, has three main components: **Strategic Projects**, **University-Industry Projects**, and **Research Networks**.

Council and staff are continuing to work on suggestions for implementing the Task Force's recommendations regarding NSERC's Scholarships programs, and Accountability and Communications.

Information on the implementation of the Task Force's recommendations will be available through *CONTACT* and NSERC's Web Site (http://www.nserc.ca).

Postgraduate Scholarships: NSERC Limits Deferral Option

In December 1994, Council approved a revision to its policy permitting recipients of NSERC postgraduate scholarships to defer tenure of their award for up to three years prior to commencing their program of studies. The revised policy, which became effective with new scholarships offered in March 1995, now permits deferral **only** for reasons of maternity, child rearing and family responsibilities.

While recognizing the benefits of the deferment option to the scholar, Council considered it necessary to modify the option in order to improve the scholarships budget forecasting process. Rates of deferment and subsequent reinstatement of deferred awards depend on many variables, including economic conditions. In recent years, Council has been unable to predict with any certainty the number of awards that would be deferred or reinstated in any given year. At the same time, Council has been forced to reduce the number of new awards it could offer in each annual PGS competition partly to compensate for the reinstatements of deferred awards from previous competitions. The cutbacks to NSERC's budget resulting from the February 1995 federal budget compounded the budgeting difficulty, necessitating immediate implementation of the revised policy.

Successful candidates who decline an award, to take up

employment for instance, will in most cases remain eligible to reapply in a future competition when they are ready to resume their studies. Although an award can never be guaranteed, the employment experience these applicants will have gained, combined with their excellent academic record, should increase their chances of succeeding in a subsequent competition. The change in the deferral option enables Council to maintain some flexibility in the PGS program while increasing the budget share allocated to students who have an immediate need for NSERC support.

Strategic Grants: 1995 Competition Results

The 1995-96 Strategic Grants competition marked a turning point in the evolution of the program. It was the last competition prior to the introduction of the revised program format recommended by NSERC's Strategy Implementation Task Force and Committee on Targeted Research and approved by Council on October 17, 1995 (see related article on p. 6).

The demand on the program decreased dramatically this year. A total of 465 applications seeking $41 million were received in comparison with the 617 applications requesting $52.8 million that were received in 1994. This represents a 25% decrease over the previous year in the number of requests received and a 22% decrease in the dollars requested.

The Strategic Grants program budget for 1995 is $39,401,008. Commitments to 299 ongoing strategic grant projects account for $25,271,127 of the budget. The panels recommended 172 new awards totalling $12,759,813 in the first year, for an overall competition success rate of 37% and a funding rate of 31.2%. The average research project award is $83,118 per year, which is slightly higher than the average research award of $81,863 per year for the 1994-95 competition. A complete summary of program commitments, by mission statement area, for 1995 can be found in Table 1.

Table 1: On-Going Commitments and New Awards

Mission Statement	Ongoing Projects		New Awards		Total		% of Total Expend.
	No.	$M	No.	$M	No.	$M	
Biotechnology	36	3.2	17	1.5	53	4.7	12.3
Energy	26	1.9	18	1.5	4	3.4	8.8
Env. Quality	36	2.7	18	1.2	54	3.9	10.4
Food, Agr. & Aqua.	67	5.2	39	2.5	106	7.8	20.4
Forestry	11	0.8	8	0.6	19	1.4	3.6
I.M.P.&P.	58	4.7	32	2.5	90	7.2	18.9
Inf. Technology	28	3.0	24	1.8	52	4.8	12.6
Manuf. Systems	10	1.0	6	0.4	16	1.4	3.7
Mineral Resources	7	0.5	0	0.0	7	0.5	1.4
New Directions	7	0.6	3	0.2	10	0.8	2.2
Oc. and In. Waters	13	1.6	7	0.6	20	2.2	5.7

Total	299	25.3	172	12.8	172	38.0	100.0

User Sector Participation

User sector interest and participation in the project is an essential component for success in the Strategic Grants program. This year, 1,001 Statements of Interest from 685 different organizations with over 2 million employees in Canada were submitted in conjunction with the applications. Sixty percent of these organizations reported 100% Canadian ownership.

Based on the complement of staff or annual sales of the interested or participating organizations, the research supported through the Strategic Grants program appears to be of interest primarily to small organizations: Of the 685 organizations mentioned above, 284 were identified as "small" (fewer than 100 employees or annual sales of less than $10 million); 124 as "medium" (between 100 and 500 employees or annual sales of between $10 million and $50 million); and 195 as "large" (more than 500 employees or annual sales in excess of $50 million).

Competition Highlights

The 1995 competition results, detailing the requests and awards made by mission statement area, can be found in Table 2 and Figure 1 (p. 10). The following projects are selected examples of highly rated proposals funded in the 1995-96 competition.

Table 2: 1995 Competition Results

Mission Statement	Requests		New Awards	
	No.	$M	No.	$M
Biotechnology	44	4.0	17	1.5
Energy	42	3.5	18	1.5
Env. Quality	73	5.7	18	1.2
Food, Agr. & Aqua.	87	7.2	39	2.5
Forestry	17	1.4	8	0.6
I.M.P.&P.	89	7.4	32	2.5
Inf. Technology	65	7.4	24	1.8
Manuf. Systems	14	1.3	6	0.4
Mineral Resources	8	0.6	0	0.0
New Directions	9	0.8	3	0.2
Oc. and In. Waters	17	1.9	7	0.6
Total	465	41.0	172	12.8

Drs. M. Pedras, G. Séguin-Swartz, D.Ward, and W. Keller have formed a strong multi-institutional team linking the University of Saskatchewan, the National Research Council, and Agriculture and Agri-Food Canada. They received $393,000 over three years to conduct research in developing new strategies for overcoming blackleg and blackspot (destructive fungal diseases) of canola, rapeseed and other brassicas. Since canola and rapeseed are major Canadian agricultural crops and annual canola losses to blackleg alone have been

estimated at over $50 million since 1984, this work has great potential for economic impact. The proposed interdisciplinary approach is expected to provide a stimulating environment for the training of future research talent in this area.

Drs. R. Childs, J.M. Dickson, and B.E. McCarry from the Department of Chemistry at McMaster University were awarded $305,898 over three years for their project on intelligent membranes for the selective recovery of acids and metal ions. This is an opportunity to develop an important new class of membranes with worldwide market potential in water treatment and to open the door to the improvement of a wide range of industrial processes in the manufacturing and metal recovery sectors. Separation technologies is a growing area in Canada and the potential to create new business or products and to expand exports is very high. Some of the many companies currently supplying membrane-based systems for the domestic and export markets are supporting this research project, as are several potential user corporations.

Drs. S. Lacroix and M. Meunier of the d,partement de g,nie physique at École Polytechnique have received $292,500 over three years for an ambitious project developing all-fiber second-order non-linear devices for telecommunications and sensing systems. This project is aimed at producing devices that have major importance in several fields of applications such as optical data storage, remote sensing, and broadband optical telecommunications applications. These devices would represent a substantial new market for Canadian companies, and several have already indicated a willingness to provide cash and in-kind support to the project.

New Agreements Signed With Korea and China

NSERC has recently signed new Memoranda of Understanding on Scientific Co-operation with the Korea Science and Engineering Foundation (KOSEF) and the National Natural Science Foundation of China (NSFC). These agreements commit the signatories to:

- exchange information;
- facilitate the movement of researchers and students between their countries; and
- provide support to researchers in their countries to travel and participate in international collaborations.

While these new agreements will enable NSERC to enhance its international collaboration activities, they do not commit the Council to specific funding mechanisms. In particular, they recognize that researchers are free to use NSERC grants to support visiting researchers, and to travel themselves.

The agreements also commit NSERC and the foreign agency to developing a list of research areas of mutual interest, in

consultation with each other and with their national research community.

The agreements come into effect on April 1, 1996.

The full text can be found on NSERC's Web site under "International Relations".

- Korea Science and Engineering Foundation (KOSEF)
- National Natural Science Foundation of China (NSFC)

Materials Research: Update on "Clusters" Initiative

On completion of its work in September 1994, NSERC's ad hoc Committee on Materials Research Facilities (CMRF) recommended that "NSERC should play a leading role in the process of facilitating and accelerating initiatives to co-ordinate resources for materials research and establish national or regional clusters of facilities." Council endorsed the recommendation and established the Advisory Committee on Clusters in Materials Research (ACCMR) to provide advice on implementing "clusters." The committee has now completed an interim report, which was presented to the Committee on Research Grants (CORG) for advice and circulated among the materials research community for comment and discussion The final report will be presented to CORG in December.

Properly developed, clusters will maximize the impact of Canada's spending on equipment resources for materials research, whether in university, government or industrial laboratories, and make these resources accessible to all qualified researchers.

For more information on this initiative, contact Robert D. McAlpine at NSERC, by e-mail: rma@nserc.ca; or by telephone: (613) 995-5829.

The recommendations in the interim report are focused under the following topics:

Characteristics of clusters,
including close proximity of equipment resources logically fitting together, a unique reservoir of research experience and excellence, common "ownership" of equipment in the cluster, and a suitable management structure to make it efficient and responsive to the users' needs;

Access to clusters,
including student "hands-on" use, travel funds and user-fees;

Clusters in government laboratories,
including policies governing access by academic users and students;

Funding of clusters,
including initial funding through all available federal, provincial and industrial sources, and eventual development of dedicated funding programs;

Accreditation and review of clusters,
including establishment of an NSERC committee (possibly a reconstituted ACCMR committee) to review and accredit clusters, and make recommendations to NSERC selection committees where appropriate.

Promoting Science Reaps Rewards

If there were a Nobel Prize for turning young people on to science, the 1995 winners of the Michael Smith Awards for Science Promotion would be contenders. The awards, which were announced at a national conference in November, are inspired by the outreach activities of Dr. Michael Smith, who donated half of his 1993 Nobel Prize in Chemistry to science promotion activities.

Winners in the private sector category were the TV science newsmagazine **@discovery.ca** and **Dupont Canada Inc**. Barely a year old, The Discovery Channel's daily newsmagazine has captured a weekly audience of more than 1.5 million of which about 80,000 are young Canadians. With its format of interviews with Canadian scientists, interactive segments, including quizzes and audience challenges, and daily columns on topics ranging from animal behaviour to the Internet, @discovery.ca offers the Canadian research community an unparalleled opportunity to reach a large science-loving audience. Dupont Canada was cited for its generosity in supporting science promotion. Inspired by recently retired vice-president Finn Hovland, many Dupont employees offer their time in supervising co-op students, making classroom presentations, tutoring, participating in job shadowing, judging science fairs, and recycling surplus equipment in schools.

The public sector awards went to four groups. Since 1989, British Columbia teachers who want to show students the link between science in the classroom and the everyday work world need only call on the British Columbia **Scientists and Innovators in the Schools Program**. The concept has now evolved into a national network of 6,000 volunteers who have reached over one million students. The **Let's Talk Science** program, based initially at the University of Western Ontario, has enjoyed parallel success. Its volunteer force, made up primarily of undergraduate students, has made tremendous

inroads in helping overcome the "science intimidation" factor found in many school classrooms. The program has spread to seven other universities and includes an annual conference for elementary teachers and a hands-on activity program for Brownies and Girl Guides. **PARTNERS**, a collaboration of the Ottawa Carleton Learning Foundation and the Ottawa Carleton Research Institute, has introduced over 30,000 grade nine students to interactive high-tech exhibits. The final winner in this category, **Quinzaine des sciences Hydro-Québec**, mounts Quebec's wildly successful, highly creative and attention-getting annual festival of science and technology. The level of public awareness and corporate support for Quinzaine des sciences provides an impressive example of just what is possible in this area.

Individuals cited for their outstanding achievement were: **Malcolm Harvey**, Director of Physics, Atomic Energy of Canada, Chalk River (the driving force bethind AECL's Science for Educators Seminar); **William J. Mullin**, Senior Teaching Associate, Department of Biology, University of New Brunswick (for his organization of numerous activities -- science fairs, summer programs -- beyond the university community); and **Gilles Ouellet**, Professor of Mathematics, CÉGEP de Sainte-Foy (author of award-winning texts and organizer of a Quebec science and math competition).

Congratulations to all the 1995 winners! Information on how to contact them and the many other groups and individuals involved in science promotion activities across Canada will be available on a new Web site that Industry Canada will be launching early in the new year.

You Too Can Make a Difference

There is an explosion in science outreach activities across Canada, and the public's interest and receptiveness to the message is growing. Whether it's contacting a producer at The Discovery Channel with an interesting science story (parkp@discovery.ca) , or inviting some high school students into your lab, it is easy to become involved. And the personal rewards can be huge! NSERC has recently prepared some handy tips on activities you might want to try out. Check out the new "Communicating science to the public: a researcher's handbook".

International Symposium Assesses R&D Impact

About 150 participants from 24 countries attended the Second International Symposium on Research Funding held in Ottawa from September 13 to 15. Hosted by NSERC and the National Natural Science Foundation of China (NSFC), the symposium brought together participants from as far away as Brazil and

New Zealand to discuss "Measuring R&D Impact" with well-known figures in the field of research evaluation.

Sessions covered topics ranging from Methodologies and Applications in the assessment of research impact, to Desired Outcomes of the process, and International Perspectives on measuring impact. Very early on, it became clear that many countries and funding agencies face similar challenges: all are more and more required to develop and use systematic methods for assessing the impacts and outcomes of their funding and programming. The basic questions facing symposium participants were:

- How can the impact of R&D be measured in a system in which R&D is carried out in many different institutions?
- How can the impact of R&D be measured in a system which is interdisciplinary and transdisciplinary in much of its activity?
- How can the work of international research collaborations be evaluated in a system which is based on national funding?
- Do evaluations of R&D themselves have an impact on R&D? and
- What effects do government S&T policies have on national S&T systems?

Discussions in the various sessions showed clearly that these questions are interconnected. Participants were very aware that R&D is measured primarily to provide input to those formulating policy and allocating resources, and that the evaluations could have strong and rapid effects on R&D systems; participants were particularly cautioned that some well-known and widely-used indicators, such as the GERD/GDP ratio, are often used inappropriately in the wider political discussions surrounding R&D and its evaluation and funding.

Throughout the symposium, participants were confronted by the limitations of trying to assess R&D impact using the standard model of measurement when current scientific, technological and economic realities are quite different than they were in the past. One participant summed up the challenge as helping to "choose the appropriate tools to use, to contribute to a particular decision, in a particular context, for a particular stakeholder." The general consensus was that it will never be possible to conduct high-quality evaluations of an individual, an institution, or a program using only pre-packaged data because of the difficulty in constructing good indicators that are appropriately weighted to offer comparative evaluations.

While the symposium raised more questions than it answered, participants generally found the sharing of experiences and insights to be very useful and agreed that a third such International Symposium should be held in the next two to three years.

The Proceedings of the Symposium will be available early in 1996 from NSERC and from its WEB site (http://www.nserc.gc.ca) under "Publications".

Good Communications Help Maintain Integrity in Research

The primary responsibility for high standards of conduct in research and scholarship rests with the individuals carrying out these activities. As the two cases below illustrate, however, problems may arise when policies or intentions are not communicated clearly whether between supervisors and students or between members of a research team.

Not only are faculty members responsible for their personal integrity, but they are responsible for ensuring that those working with them are aware of their expectations with regard to integrity. A researcher at a Canadian university informed his university and NSERC that a postdoctoral student was suspected of fabricating data. The university investigated the case and concluded that the student had indeed fabricated data that were used in the student's PhD thesis as well as in a number of publications the student and researcher had coauthored. The university revoked the student's doctoral degree and the publications were withdrawn. NSERC's Committee on Professional and Scientific Integrity (CPSI) reviewed the university report and recommended that the student be barred from participating in NSERC programs for a period of ten years. The Committee considered data fabrication to be an issue having grave implications for the whole research enterprise and therefore meriting a severe sanction. The president of NSERC accepted the recommendation. This case illustrates the need to establish an integrity standard for a research group and to ensure that all group members, including graduate students and technical and professional personnel, are aware of the standard. It also shows how important it is for researchers to be fully aware of the work their students are carrying out.

Collaborative research is another area where problems can occur. A researcher at a Canadian university, who collaborated on an NSERC Strategic Grant, complained that the final report on the grant misrepresented the progress on the grant. In addition, the researcher indicated that the first authorship on some of the publications resulting from the project was not appropriate. The university was asked to investigate. It was evident from the university report that the project had suffered from a lack of leadership. There had been no clear agreement on the responsibilities of the various investigators or on their financial contributions to the project, and no discussion of authorship of publications resulting from the project. In addition, the principal investigator had taken on additional responsibilities during the term of the grant and delegated

much of the work to technical staff, with little supervision. The university report concluded that although the project had been poorly managed, there was no evidence of misconduct. The authorship dispute was a reflection of this lack of management. NSERC's CPSI concurred with this conclusion. This case illustrates the importance in all collaborative research of establishing a clear understanding at the outset of a project on the responsibilities of the participants and on authorship credit for publications. Further, in today's changing research environment, where there is increased emphasis on commercialization, collaborators should reach an agreement on intellectual property before the start of a project.

Integrity Conference Report Available

The final report of the November 1994 tri-council conference on "Integrity in Research and Scholarship: A Collective Responsibility" is now available.

You can also obtain one by writing to the Distribution Centre, NSERC, 350 Albert Street, Ottawa, Ontario K1A 1H5; by calling (613) 996-3078; or by sending a fax to (613) 992-5337, or an e-mail to z-distribution@nserc.ca.

CONTACT Gets "Thumbs Up" From Readers

To find out whether *CONTACT* is in tune with what its readers want, we conducted a readership survey in May. The response rate was overwhelming. Of the 1500 readers surveyed, 503 or 33.5% replied. That was a significant increase over the number of responses to our previous survey in the fall of 1988 (although even that figure, 21%, was an excellent rate of response for a survey). We wish to thank all those who participated in the 1995 survey. The results will be invaluable to us as we plan future issues.

What did the readers tell us? First, the majority of respondents are satisfied with the newsletter:

- 87% said it meets their information needs about the Council and its programs;
- 88% like the current format, layout, and balance of text and illustrations;
- 80% were content with the current frequency of four issues per year.

We were pleased to learn that 60% keep back issues for at least a year for reference.

We discovered that only 27% of respondents were aware that they could access *CONTACT* on the Internet through NSERC's Gopher server (although our Fall/Winter 1994 issue of the

newsletter described the launch of the online service), and only 38% of those who knew they could access the newsletter electronically had done so. (Editor's note: The Gopher site is being phased out. On September 1, we launched our World Wide Web site -- www.nserc.gc.ca --and *CONTACT* can be found there under "Publications.") Asked if they felt we should keep both printed and online versions, 69% wanted both while only 24% felt we should produce an online version only. However, when it came to a popular feature, the lists of NSERC committee and staff members, the numbers were much closer. We have since decided that, beginning in 1996, these lists will be available online only.

In terms of article preference, readers said they were most interested in the following types of articles (arranged in descending order according to the number of respondents who said they were very important):

- NSERC policy and funding decisions affecting grants or scholarships;
- analysis and presentation of NSERC competition results;
- lists of NSERC committee members;
- guidelines and tips on application procedures;
- lists of NSERC staff members.

Of moderate interest to the respondents were articles such as (also arranged in descending order):

- interviews with representatives of government, academia, and industry on current issues of importance to NSERC's community;
- news of appointments, achievements, international awards, and coming events;
- announcements of new university-industry chairs and other awards;
- reader opinions/letters re issues of importance to NSERC's community.

The following are some of the topics suggested by respondents for future articles:

- an explanation of the evaluation process (i.e., a description of both the common pitfalls and noteworthy features of applications), to help applicants put together winning proposals;
- news on international trends and other funding agencies to assess where Canada stands relative to other countries;
- university-industry interaction;
- how researchers can increase public awareness of the value of NSERC-funded research.

Many suggestions were made that will help us to decide where we go from here. Our main consideration has to be duplication of material on the Web and in print. How long should we continue to produce a print version of *CONTACT* as well as an

electronic version? If timely budget information is put up immediately on the Web, is there any point in sending it out perhaps a month or two later in print?

Thanks again to all those who participated. If you weren't among the group selected for this survey but have some comments you would like to make about the newsletter, please send them anytime. Readers' letters are always welcome. Address your comments to: Editor, *CONTACT*, Communications Division, NSERC, 350 Albert Street, Ottawa, Ontario K1A 1H5; E-Mail, comm@nserc.ca; Fax, (613) 943-0742.

Assessing Program Performance

In the present environment of budgetary restraint and reductions, organizations are being asked to show more explicitly what return they are obtaining for the country from their investments of public funds. NSERC has recognized this requirement and has made accountability one of the principles of its philosophy and strategy. Accordingly, NSERC is exploring more effective ways of assessing how well its programs are performing, and especially of demonstrating the impact of the university-based research that it has supported.

Formerly NSERC, like most other government agencies, relied mainly on periodic program evaluation studies for assessing the performance of its programs. These studies aimed to answer some very specific questions:

- To what extent has the program achieved what it set out to do?
- What else has happened (or is happening) as a result of the program?
- Is this program the most cost-effective way to bring about these results?
- Is there still a need for this sort of program?

The studies addressing these basic questions were generally large comprehensive undertakings, yielding detailed and relatively reliable data. But they were time consuming, and each program was evaluated only on an eight- to nine-year cycle. This meant that up-to-date information on the program's performance was often not available when needed, either for management or accountability purposes. To remedy this, NSERC, like other agencies, is moving towards a system that involves collecting and reporting on certain evaluative data on a regular basis and supplementing the data occasionally by small in-depth studies.

Today, evaluation techniques use "indicators" to answer the basic questions. Often several "partial" indicators are needed to answer a question fully. For example, to answer what has

happened as a direct outcome of a research grant, one indicator would be the dissemination of new knowledge in publications in a peer-reviewed journal. Depending on the research field, however, this knowledge may be more likely communicated in a trade journal, a workshop or conference. Thus two of several partial indicators for research activity would be: publications in a journal, and papers given at a conference. In fact, to address most evaluation issues, a set of partial indicators are needed. Some would probably be difficult to measure, however, in terms of time or resources. So there usually has to be a trade-off between what is desirable and what is feasible.

Questions dealing with a program's shorter term objectives and whether it is "reaching" its intended clientele are examples of the type of issues that can be addressed regularly, at least in part by measures on a set of performance indicators. The longer term impacts would require more effort to document, however, and it may not be possible to cover these on such a frequent basis. Issues requiring some in-depth study are those of "unexpected" effects of the program, and "incrementality" -- the extent to which an observed result can be attributed to the program (and not to some other interplay of factors).

NSERC is aiming at developing sets of "performance indicators" for all of its programs. Currently the Program Evaluation Committee, which oversees NSERC's evaluation activities, is playing an active role in developing a set for the Research Grants program. This coincides with the pending evaluation of the program. The last one was a very detailed study that took two years to complete and was finished in November 1986. The evaluation of the Research Grants program is a particularly complex task from two aspects: "attribution," and the fact that two of its three objectives are to an extent in competition. "Attribution," or the attributing of observed effects to a program and its grant funds, poses a problem because the Research Grants program provides "partial" support for the "direct" costs of ongoing programs of investigator-driven research. Thus any research "output" from a grant would in many cases not be entirely attributable to the Research Grant. And because of the nature of "investigator-driven" research, by the time the longer term impacts surface in the socio-economic fabric of the country, the original research has been used by other parties. That again clouds the "attribution" to a particular grant, or grants. The other complicating factor is competition between the stated program objectives of supporting both "research excellence" and "a diversified base."

The development of performance indicators for the Research grants program is still in its early stages. One of the feasibility studies under way is aimed at assessing the validity of bibliometrics as "one" tool for reporting on the "knowledge output" that is disseminated in journals. As the evaluation study proceeds, NSERC will continue to call upon its advisors for their help and counsel in order to produce a credible and

complete analysis of the workings and achievements of this important granting program.

Show Your Appreciation

With the end of the year fast approaching, it's time to look back and reflect on progress made and on those who helped make it possible. Some of you, particularly those whose research involved field work, may feel indebted to private citizens. Often their local knowledge and logistic assistance not only helps to keep research costs down but also helps make the research more productive. If you have found yourself the recipient of the enthusiastic support of a non-scientist in recent months, and have been meaning to do something to show your appreciation, why not do it now?

Or, let us do it for you by sending a Friend(s) of NSERC Certificate to the individual or group you have identified. Remember, if you are funded by NSERC in any capacity, you may nominate private citizens who have provided assistance, material or logistic support. For instance:

A professor and his research assistant at Dalhousie University nominated a couple who operate an isolated fishing lodge in northern Saskatchewan that controls the access to a chain of lakes essential to their research. Not only did the couple let the researchers use the camp at no cost, but they provided them with laundry and shower facilities, and even treated them to Sunday suppers. In asking NSERC to recognize the couple's generosity and trust, the professor stated that their contributions "have been unsurpassed in 30 years of working in the field."

The administrative chair of a Canadian research centre that is funded through an NSERC infrastructure grant and supports NSERC researchers nominated three companies and one individual who contributed money, equipment, or services to the centre.

A professor at the Technical University of Nova Scotia nominated an individual in a U.S. firm for sharing his design and development experience with the university team building a unique piece of research equipment. As a result of the technology transfer arrangement, TUNS will be the only research institution in Canada to have such a unit.

If you would like to nominate an individual or group, just send us a note. Include details of the help given you as well as the name and mailing address of those nominated, and we'll send them a "Friend of NSERC" certificate thanking them on your behalf and NSERC's for their help.

Address nominations to: Friends of NSERC

Communications Division, NSERC
Ottawa, Ontario K1A 1H5
Fax: (613) 943-0742
E-mail: comm@nserc.ca.

Created: 1997-01-17
Updated: 2004-02-25

Important Notices